CLAIMS

We claim:

1. A method for generating a polypeptide exhibiting enhanced immunogenicity, said method comprising:

a) inputting a target backbone structure with variable residue positions into a computer;

b) applying, in any order:

i) at least one computational protein design algorithm; and

ii) at least one computational immunogenicity filter; and

c) identifying at least one variant protein with enhanced immunogenicity.

2. A method for generating a polypeptide exhibiting reduced immunogenicity, said method comprising:

a) inputting a target backbone structure with variable residue positions into a computer;

b) applying, in any order:

i) at least one computational protein design algorithm; and

ii) at least one computational immunogenicity filter; and

c) identifying at least one variant protein with reduced immunogenicity.

3. A method of eliciting an enhanced immune response in a patient, said method comprising:

a) inputting a target backbone structure with variable residue positions into a computer;

b) applying, in any order:

i) at least one computational protein design algorithm; and

ii) at least one computational immunogenicity filter;

c) identifying at least one variant protein with enhanced immunogenicity; and

d) administering said variant protein to a patient.

4. A method according to claim 1, 2, or 3 wherein said computational protein design algorithm is applied prior to said filter.

5. A method according to claim 1, 2, or 3 wherein said computational protein design algorithm is applied subsequent to said filter.

6. A method according to claim 1, 2, or 3 wherein said computational protein design algorithm comprises said filter as a scoring function.

7. A method according to claim 1, 2, or 3 wherein said target protein is selected from the group consisting of Zn-alpha2-glycoprotein, human serum albumin, immunoglobulin G and non-immunogenic proteins.

8. A method according to claim 1, 2, or 3 wherein said computational immunogenicity filter comprises a scoring function for MHC class I motifs.

9. A method according to claim 1, 2, or 3 wherein said computational immunogenicity filter comprises a scoring function for MHC class II motifs.

10. A method according to claim 1, 2, or 3 wherein said enhanced immunogenicity is due to the presence of at least one immunogenic sequence.

11. A method according to claim 10 wherein said immunogenic sequences are the same.

12. A method according to claim 10 wherein said immunogenic sequences are different.

13. A method according to claim 10, 11, or 12 wherein said immunogenic sequence is selected from the group consisting of B cell epitopes, T cell epitopes, MHC class I motifs and MHC class II motifs.

14. A method according to claim 10 wherein said immunogenic sequence further comprises a specific cleavage motif.

15. A method according to claim 1, 2 or 3 wherein said computationally generating step comprises a DEE computation.

16. A method according to claim 15 wherein said DEE computation is selected from the group consisting of original DEE and Goldstein DEE.

17. A method according to claim 1, 2, or 3 wherein said set of primary variant amino acid sequences are optimized for at least one scoring function.

18. A method according to claim 17 wherein said set of primary variant amino sequences optimized for at least one scoring function comprises the globally optimal protein sequence.

19. A method according to claim 17 wherein said scoring function is selected from the group consisting of a Van der Waals potential scoring function, a hydrogen bond potential scoring function,

an atomic solvation scoring function, an electrostatic scoring function and a secondary structure propensity scoring function.

20. A method according to claim 1, 2 or 3 wherein said computationally generating step includes the use of a Monte Carlo search.

21. A modified polypeptide exhibiting enhanced immunogenicity made by the method according to claim 1, 2 or 3.

22. A method according to claim 3 wherein said variant protein is selected from the group consisting of variants of Zn-alpha2-glycoprotein, human serum albumin, immunoglobulin G, non-immunogenic proteins, and mixtures thereof.